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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/814,853	03/30/2004	Qinghua Li	884.C50US1	5604
21186 7590 07/09/2007 SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A. P.O. BOX 2938 MINNEAPOLIS, MN 55402			EXAMINER MERED, HABTE	
			ART UNIT 2616	PAPER NUMBER
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

**Office Action Summary**

Application No.

10/814,853

Applicant(s)

LI ET AL.

Examiner

Habte Mered

Art Unit

2616

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 30 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-26 is/are allowed.
- 6) ☐ Claim(s) \_\_\_\_\_ is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>10.27.05&amp;08.23.04</u> | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

1. This Office Action is in response to the communication filed on 11/30/2004 and to the preliminary amendment filed on 11/30/2005.
2. The preliminary amendment filed on 11/30/2005 has been entered and fully considered.
3. Claims 1-26 are pending. Claims 1, 8, 14, 19, and 22 are the base independent claims.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. **Claims 1-26** are rejected under 35 U.S.C. 103(a) as being unpatentable over Walton et al (US Pub. No. 2006/0039312), hereinafter referred to as Walton in view of Priotti (US Pub. No. 20040120410).

*Walton teaches resource allocation for MIMO-OFDM communication systems.*

5. Regarding **claims 1 and 8**, Walton discloses a method (**Figures 9 and 10a**), including: converting a combined plurality P of asynchronous data streams received at substantially the same time (**Figure 10a, 852a....854r all received in time domain**) from a first time domain to a frequency domain (**Figure 9, paragraphs 242-244**) ; separating, the combined plurality P of asynchronous data streams into a separated

plurality of data streams in the frequency domain (**Figure 9, S1...Snd are asynchronous data streams in frequency domain.**)

Walton fails to teach synchronizing at least one of the separated plurality of data streams in a second time domain. **(Please note technically Walton can be considered to teach this limitation as it adds cyclic prefix for synchronization purposes with the downlink receiver as shown in Figure 9)**

*Priotti teaches apparatus and associated method for effectuating post-FFT correction of fine frequency offset.*

Priotti teaches synchronizing at least one of the separated plurality of data streams in a second time domain. **(See Paragraph 43 and Figure 1, element 116. It should be noted here that neither a receiver or a transmitter is claimed and hence element 116 of Figure 1 can be considered a second time domain synchronization taking into consideration the first time domain conversion at the transmitter. Never the less, Priotti clearly teaches synchronization in the time domain. Applicant correctly indicates in paragraph 46 of the specification that synchronization in time domain is conventional and hence well known in the art. Priotti shows in Figure 1 that the various user signals combined in time when received at the receiver is synchronized in time domain. Applicant indicates in paragraph 9 of the specification the need to do the well-known technique of synchronization in the time domain in a second time domain simply because separating asynchronous signals in time domain is a complex task without really explaining why or citing a prior art for support. However, the Applicant has not**

**taught a new technique of synchronization apart from what is taught by Priotti and which is known in the art and also multiplexing and demultiplexing different user signals in time domain is well known in the art and hence synchronizing in a first or second time domain is simply a design decision.)**

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Walton's method to incorporate the step of synchronizing at least one of the separated pluralities of data streams in a second time domain. The motivation to synchronize in the time domain prior to preprocessing the signals in the receiver or post- processing the signals in the receiver is to prevent errors in the future due to lack of synchronization.

6. Regarding **claims 14 and 19**, Walton discloses an apparatus (**See Figure 9**), including: a module to separate, in a frequency domain (**Figure 9, element 814x and 908**), a combined plurality P of asynchronous data streams received at substantially a same time into a separated plurality of data streams (**See Figures 10a&b, 852a....852r**), after the combined plurality P of asynchronous data streams have been converted from a first time domain to the frequency domain (**See Figure 9, V1....Vnt**);

Walton fails to disclose an apparatus with a synchronization module to synchronize at least one of the separated plurality of data streams in a second time domain. **(Please note technically Walton can be considered to teach this limitation as it adds cyclic prefix for synchronization purposes with the downlink receiver as shown in Figure 9)**

Priotti teaches an apparatus with a synchronization module to synchronize at least one of the separated plurality of data streams in a second time domain. (See Paragraph 43 and Figure 1, element 116. It should be noted here that neither a receiver or a transmitter is claimed and hence element 116 of Figure 1 can be considered a second time domain synchronization taking into consideration the first time domain conversion at the transmitter. Never the less, Priotti clearly teaches synchronization in the time domain. Applicant correctly indicates in paragraph 46 of the specification that synchronization in time domain is conventional and hence well known in the art. Priotti shows in Figure 1 that the various user signals combined in time when received at the receiver is synchronized in time domain. Applicant indicates in paragraph 9 of the specification the need to do the well-known technique of synchronization in the time domain in a second time domain simply because separating asynchronous signals in time domain is a complex task without really explaining why or citing a prior art for support. However, the Applicant has not taught a new technique of synchronization apart from what is taught by Priotti and which is known in the art and also multiplexing and demultiplexing different user signals in time domain is well known in the art and hence synchronizing in a first or second time domain is simply a design decision.)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Walton's apparatus by incorporating a synchronization module to synchronize at least one of the separated pluralities of data streams in a

second time domain. The motivation to synchronize in the time domain prior to preprocessing the signals in the receiver or post-processing the signals in the receiver is to prevent errors in the future due to lack of synchronization.

7. Regarding **claim 22**, Walton fails to disclose a system (**Figures 8-10**) including, a module to separate, in a frequency domain (**Figure 9, element 814x and 908**), a combined plurality P of asynchronous data streams received at substantially a same time into a separated plurality of data streams, after the combined plurality P of asynchronous data streams have been converted from a first time domain to the frequency domain (**See Paragraph 244 and Figure 9, V1....V1n are asynchronous data streams in frequency domain**); and a plurality Q of antennas to receive the combined plurality P of asynchronous data streams. (**See Figures 10a&b, 852a....852r**),

Walton fails to disclose an apparatus with a synchronization module to synchronize at least one of the separated plurality of data streams in a second time domain. (**Please note technically Walton can be considered to teach this limitation as it adds cyclic prefix for synchronization purposes with the downlink receiver as shown in Figure 9**)

Priotti teaches an apparatus with a synchronization module to synchronize at least one of the separated plurality of data streams in a second time domain. (**See Paragraph 43 and Figure 1, element 116.**)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Walton's system by incorporating a synchronization module to synchronize at least one of the separated pluralities of data streams in a

second time domain. The motivation to synchronize in the time domain prior to preprocessing the signals in the receiver or post-processing the signals in the receiver is to prevent errors in the future due to lack of synchronization.

8. Regarding **claim 2**, Walton discloses a method further including separating the combined plurality P of asynchronous data streams using a channel matrix. **(See Paragraph 47, Tables 1&2, and Equations 1&2)**

7. Regarding **claim 3**, Walton discloses a method, further including: receiving, at substantially the same time, the combined plurality P of asynchronous data streams at a plurality Q of antennas. **(See Figures 10a&b, elements 852a.... 852r),**

8. Regarding **claim 4**, Walton discloses a method, further including: separating the combined plurality P of asynchronous data streams into the separated plurality of data streams in the frequency domain using a frequency spatial demapper. **(Figure 9, element 908 and Figure 10, element 1010 and see also paragraph 245)**

9. Regarding **claim 5**, Walton discloses a method, wherein the separated plurality of data streams correspond directly to a number of wireless channels. **(See Figures 8 and 10)**

10. Regarding **claims 6 and 18**, the combination of Walton and Priotti discloses a method wherein at least one of the separated plurality of data streams is formatted according to one of an Institute of Electrical and Electronics Engineers 802.11 standard and an Institute of Electrical and Electronics Engineers 802.16 standard. **(See Priotti – paragraph 60)**



11. Regarding **claim 7**, the combination of Walton and Priotti discloses a method, further including: converting the separated plurality of data streams into the second time domain prior to the synchronizing (**See Walton Figure 9, elements 940a..940t and Priotti Figure 1, element 114**)
12. Regarding **claim 9**, Walton discloses a wireless access point performs the separating the data streams. (**See Figure 1, element 104**)
13. Regarding **claim 10**, Walton discloses an article wherein the information, when accessed, results in the machine performing: computing a frequency response for a number of channels corresponding to the plurality P of asynchronous data streams. (**See paragraphs 50 and 244**)
14. Regarding **claim 11**, the combination of Walton and Priotti discloses an article wherein the information, when accessed, results in the machine performing: converting the separated plurality of data streams in the frequency domain into a separated plurality of data streams in the second time domain. (**See Walton Figure 9, elements 940a..940t and Priotti Figure 1, element 114**)
15. Regarding **claim 12**, the combination of Walton and Priotti discloses an article, wherein the information, when accessed, results in the machine performing: synchronizing at least one of the separated plurality of data streams after detecting a presence of a short preamble. (**This is conventional synchronizing technique as admitted by Applicant in paragraph 46 of the specification**)

13. Regarding **claim 13**, the combination of Walton and Priotti discloses an article, wherein the information when accessed results in the machine performing estimating a coarse frequency set. **(See Priotti – Paragraph 5)**

14. Regarding **claim 15**, Walton discloses an apparatus wherein the module to separate further includes: a spatial demultiplexer to provide the separated plurality of data streams. **(Figure 9, element 908 and Figure 10, element 1010 and see also paragraph 245)**

15. Regarding **claim 16**, Walton discloses an apparatus, wherein the module to separate further includes: a module to perform a fast Fourier transform on the combined plurality P of asynchronous data streams **(See Paragraph 244)**; and a module to perform an inverse fast Fourier transform on at least one of the separated plurality of data streams **(See Paragraph 238)**.

16. Regarding **claim 17**, the combination of Walton and Priotti discloses wherein the synchronization module is to receive at least one of the separated plurality of data streams after processing by a module capable of performing an inverse fast Fourier transform. the synchronization module is to receive at least one of the separated plurality of data streams after processing by a module capable of performing an inverse fast Fourier transform. **(See Priotti Figure 1, elements 114 and 116)**

17. Regarding **claim 20**, Walton discloses an apparatus wherein at least some of the separated plurality of data streams include a plurality of OFDM symbols. **(See paragraphs 5 and 238)**

18. Regarding **claim 21**, the combination of Walton and Priotti discloses an apparatus wherein the synchronization module is to receive at least one of the separated plurality of data streams after processing by a module capable of performing an inverse fast Fourier transform. **(Priotti – paragraph 5)**

19. Regarding **claim 23**, Walton discloses a system wherein the plurality Q of antennas form a portion of a multiple-input, multiple-output (MIMO) system. **(See paragraph 229)**

20. Regarding **claim 24**, Walton discloses a system further including a wireless access point coupled to the plurality Q of antennas. **(See Figure 1, 104)**

21. Regarding **claim 25**, the combination of Walton and Priotti discloses a system wherein the wireless access point is to train at least one channel for at least some of a plurality of P users associated with the combined plurality P of asynchronous data streams. **(See Priotti – Figure 1, elements 114 and 116)**

22. Regarding **claim 26**, Walton discloses a system, further including: a processor to form a  $Q \times P$  channel matrix. **(See Figure (, elements 820x and 814x and see also Paragraphs 47 and 219, Tables 1&2, and Equations 1&2)**


### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Habte Mered whose telephone number is 571 272 6046. The examiner can normally be reached on Monday to Friday 9:30AM to 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Doris H. To can be reached on 571 272 7629. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

HM  
6-24-2007



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